Effects of biodiversity on ecosystem, community, and population variables reported 1974–2004

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Abstract: This metadata set contains 761 effects of biodiversity on ecosystem, community, or population response variables reported in 137 publications from 1974 to June 2004. All data were obtained in experimental studies. Relationships between species richness or other biodiversity measures and response variables are described by their shape, direction, significance, and if available, the simple (regression) or multiple (analysis of variance) correlation coefficient. We classified response variables into groups according to the ecosystem function or service to which they were related, the trophic level at which they were measured, and several other classification schemes. Similarly, we classified studies into groups according to ecosystem type, experimental system (bottle/pot, greenhouse, field), range and trophic level of biodiversity treatments, and further design variables. Covariates include location of study, number of plots, and number of species used in the biodiversity treatments. Analyses of these metadata have shown, for example, that biodiversity effects on community (and ecosystem) variables are often positive, and those on population variables negative, that stocks are more responsive than rates to biodiversity manipulation, and that bottom-up biodiversity effects in multi-trophic studies are often negative. This metadata set gives a representative overview of the results of a first generation of biodiversity experiments and allows a quantitative assessment of the influence of a number of biological and design variables on the significance and shape of the relationship between biodiversity and response variables.

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Bernhard Schmid,[1,3] Andrea B. Pfisterer,[1] and Patricia Balvanera[2]

[1]*Institute of Environmental Sciences, Universität Zürich, Winterthurerstrasse 190, CH-8057, Zürich, Switzerland*
[2]*Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México*

Abstract. This metadata set contains 761 effects of biodiversity on ecosystem, community, or population response variables reported in 137 publications from 1974 to June 2004. All data were obtained in experimental studies. Relationships between species richness or other biodiversity measures and response variables are described by their shape, direction, significance, and if available, the simple (regression) or multiple (analysis of variance) correlation coefficient. We classified response variables into groups according to the ecosystem function or service to which they were related, the trophic level at which they were measured, and several other classification schemes. Similarly, we classified studies into groups according to ecosystem type, experimental system (bottle/pot, greenhouse, field), range and trophic level of biodiversity treatments, and further design variables. Covariates include location of study, number of plots, and number of species used in the biodiversity treatments. Analyses of these metadata have shown, for example, that biodiversity effects on community (and ecosystem) variables are often positive, and those on population variables negative, that stocks are more responsive than rates to biodiversity manipulation, and that bottom-up biodiversity effects in multi-trophic studies are often negative. This metadata set gives a representative overview of the results of a first generation of biodiversity experiments and allows a quantitative assessment of the influence of a number of biological and design variables on the significance and shape of the relationship between biodiversity and response variables.

Key words: aquatic ecosystems; biodiversity experiments; design variables; ecosystem functioning; ecosystem services; effect size; significance; terrestrial ecosystems; trophic level.

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[3] E-mail: bernhard.schmid@uwinst.uzh.ch